Amendments to the Claims

Claim 1 (currently amended): An interleaver comprising:

a birefringent element assembly comprising at least one spatial birefringent element, the birefringent element assembly providing two output components;

a reflector configured to direct the two components from the birefringent element assembly back through the birefringent element assembly;

wherein the spatial birefringent element first separates an optical beam into two orthogonally polarized components, each of the two components travels along separate paths of different optical path lengths such that when the two components recombine at the output of the spatial birefringent element a birefringent effect is achieved.

Claim 2 (original): The interleaver as recited in claim 1, further comprising a polarization rotator configured to align the two components prior to the two components being transmitted back through the birefringent element assembly such that approximately zero dispersion is obtained in an output of the interleaver.

Claims 3-6 (canceled)

Claim 7 (original): The interleaver as recited in claim 1, wherein the birefringent element assembly comprises a plurality of spatial birefringent elements.

Claim 8 (original): The interleaver as recited in claim 1, wherein the birefringent element assembly comprises a first birefringent element having an equivalent angular orientation of φ_1, a

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second birefringent element having an equivalent angular orientation of φ_2 and a third birefringent element having an equivalent angular orientation of φ_3;

wherein an order of the first birefringent element, second birefringent element, and third birefringent element is selected from the group consisting of:

first birefringent element, second birefringent element, third birefringent element;

third birefringent element, second birefringent element, first birefringent element; and

wherein the equivalent angular orientations are with respect to an equivalent polarization direction of light entering the birefringent element assembly.

Claim 9 (original): The interleaver as recited in claim 1, wherein the birefringent element assembly comprises:

a first birefringent element having an equivalent angular orientation of 45° and having a phase delay of Γ;

a second birefringent element having an equivalent angular orientation of -21° and having a phase delay of 2Γ; and

a third birefringent element having an equivalent angular orientation of 7° and having a phase delay of 2Γ.

Claim 10 (original): The interleaver as recited in claim 1, wherein the birefringent element assembly comprises two birefringent elements.

Claim 11 (original): The interleaver as recited in claim 1, wherein the birefringent element assembly comprises:

a first birefringent element having an equivalent angular orientation of 45° and having a phase delay of Γ ; and

a second birefringent element having an equivalent angular orientation of -21° and having a phase delay of 2Γ.

Claim 12 (original): The interleaver as recited in claim 1, wherein the birefringent element assembly and the reflector are configured so as to facilitate interleaving of a plurality of input light beams simultaneously.

Claim 13 (currently amended): The interleaver as recited in claim 1, wherein each spatial birefringent element defines two light paths, each light path having a different optical path length and wherein a difference in optical path length between the two paths is provided by a material having an index of refraction greater than ~~one~~ unity ~~which~~ that is disposed within at least a portion of one of the first and second paths.

Claim 14 (original): The interleaver as recited in claim 1, wherein each spatial birefringent element defines two light paths and wherein an index of refraction is different for at least a portion of at least one of the two light paths so as to cause the two light paths to have different optical path lengths.

Claim 15 (currently amended): The interleaver as recited in claim 1, wherein the ~~interleaved~~ interleaver channels have spacing which is tunable.

Claim 16 (currently amended): A birefringent element assembly comprising:

at least one spatial birefringent element; and

a polarization rotator for controlling an equivalent angle of the birefringent element assembly;

wherein the spatial birefringent element first separates an optical beam into two orthogonally polarized components, each of the two components travels along separate paths of different optical path lengths such that when the two components recombine at the output of the spatial birefringent element a birefringent effect is achieved.

Claim 17 (canceled)

Claim 18 (currently amended): A method for interleaving, the method comprising:

transmitting light through a birefringent element assembly comprised of at least one spatial birefringent element, the birefringent element assembly separating the light into first and second components;

making the two components polarized along desired polarization directions; and

transmitting the first and second components back through the birefringent element assembly;

wherein the spatial birefringent element first separates an optical beam into two orthogonally polarized components, each of the two components travels along separate paths of different optical path lengths such that when the two components recombine at the output of the spatial birefringent element a birefringent effect is achieved.

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Claim 19 (canceled)

Claim 20 (currently amended): An interleaver comprising:

a birefringent element assembly comprising at least one spatial birefringent element;

a reflector configured to direct an output of the birefringent element assembly back through the birefringent element assembly;

wherein the spatial birefringent element first separates an optical beam into two orthogonally polarized components, each of the two components travels along separate paths of different optical path lengths such that when the two components recombine at the output of the spatial birefringent element a birefringent effect is achieved; and

wherein phase delays and birefringent element orientations for the birefringent element assembly are selected from the table:

Table I

First Stage Phase Delays	First Stage Orientations	Second Stage Phase Delays	Second Stage Orientations
$\Gamma + 2m_1\,\pi$, $2\Gamma + 2m_2\,\pi$, $2\Gamma + 2m_3\,\pi$	$\varphi_1, \varphi_2, \varphi_3$	$2\Gamma' + 2k_3\,\pi$, $2\Gamma' + 2k_2\,\pi$, $\Gamma' + 2k_1\,\pi$	$90°\pm\varphi_3$, $90°\pm\varphi_2$, $90°\pm\varphi_1$ (parallel component) $\pm\varphi_3$, $\pm\varphi_2$, $\pm\varphi_1$ (orthogonal component) where $\Gamma - \Gamma' = 2l\pi$
$\Gamma + 2m_1\,\pi$, $2\Gamma + 2m_2\,\pi$, $2\Gamma + 2m_3\,\pi$	$\varphi_1, \varphi_2, \varphi_3$	$2\Gamma' + 2k_3\,\pi$, $2\Gamma' + 2k_2\,\pi$, $\Gamma' + 2k_1\,\pi$	$90°\pm\varphi_3$, $90°\pm\varphi_2$, $90°\pm\varphi_1$ (parallel component) $\pm\varphi_3$, $\pm\varphi_2$, $\pm\varphi_1$ (orthogonal component) where $\Gamma - \Gamma' = (2l + 1)\,\pi$
$2\Gamma + 2m_3\,\pi$, $2\Gamma + 2m_2\,\pi$, $\Gamma + 2m_1\,\pi$	$\varphi_3, \varphi_2, \varphi_1$	$\Gamma' + 2k_1\,\pi$, $2\Gamma' + 2k_2\,\pi$, $2\Gamma' + 2k_3\,\pi$	$90°\pm\varphi_1$, $90°\pm\varphi_2$, $90°\pm\varphi_3$ (parallel component) $\pm\varphi_1$, $\pm\varphi_2$, $\pm\varphi_3$ (orthogonal component) where $\Gamma - \Gamma' = 2l\pi$
$2\Gamma + 2m_3\,\pi$, $2\Gamma + 2m_2\,\pi$, $\Gamma + 2m_1\,\pi$	$\varphi_3, \varphi_2, \varphi_1$	$\Gamma' + 2k_1\,\pi$, $2\Gamma' + 2k_2\,\pi$, $2\Gamma' + 2k_3\,\pi$	$\pm\varphi_1$, $\pm\varphi_2$, $\pm\varphi_3$ (parallel component) $90°\pm\varphi_1$, $90°\pm\varphi_2$, $90°\pm\varphi_3$ (orthogonal component) where $\Gamma - \Gamma' = (2l + 1)\,\pi$

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Wherein m_1, m_2, m_3, k_1, k_2, k_3 and l are integers $(0, \pm 1, \pm 2, \ldots)$.

Claim 21 (currently amended): An interleaver comprising:

at least one birefringent element assembly, each birefringent element assembly comprising at least one spatial birefringent element; and

a reflector configured to direct light which has passed through each of the birefringent element assemblies sequentially back through each of the birefringent element assemblies sequentially in a reverse direction;

wherein the spatial birefringent element first separates an optical beam into two orthogonally polarized components, each of the two components travels along separate paths of different optical path lengths such that when the two components recombine at the output of the spatial birefringent element a birefringent effect is achieved.